

CLOSED LOOP FINANCIAL TRANSACTION  
METHOD AND APPARATUS

5

BACKGROUND OF THE INVENTION

## 1. Field of the Invention

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The present application is a continuation in part of Serial No. 113,205  
A1 filed on 08/27/93.

The present invention relates generally to closed loop financial transactions. More specifically, the present invention is a method and apparatus for processing financial transactions automatically, including loans, applications for credit, establishment of accounts and other transactions that typically take place at banks.

## 2. Discussion of Background

Currently, consumers go to banks, credit unions and other types of financial institutions for a wide variety of services. At these institutions, one can deposit and withdraw money, transfer funds from one account to another, establish checking and savings accounts, arrange for automatic deposits to and withdrawals from accounts, apply for credit and debit cards, establish and fund individual retirement accounts, purchase certificates of deposit and savings bonds, obtain cashier's checks, and order checks for checking accounts. Although the numbers and types of financial institutions have proliferated, going to these during normal working hours is still a chore.

For years, night deposit boxes have made it possible for businesses and individuals to deposit money in a bank after hours. The advent of automatic teller machines make some of these financial services, particularly withdrawal of funds from checking accounts and the obtaining of cash advances against a credit card limit, possible both during the day and after normal banking hours. Of course, many financial transactions can still be handled through the mail. Nonetheless, there remains a significant number of services that can only be provided to a consumer if he or she is willing and able to go to a financial institution to get them.

An example of one such service is borrowing money. Borrowed money is essential to facilitate commerce and personal finance. Individuals and businesses borrow money on both a short term and a long term basis for better management of their day-to-day financial transactions and to obtain the goods and services they need when they need them. If the need to borrow money is anticipated, the arrangements for borrowing can be made in advance of the need. But financial needs are sometimes not foreseen, and the extent of a financial need is not always known or knowable in advance. Furthermore, these arrangements are usually somewhat of a necessary inconvenience because they take time and effort to complete.

When an individual needs to borrow money, the lender will not only expect repayment, but will also want to have confidence that the amount lent can be repaid on time. The effort by the borrower to provide the lender with this confidence level will depend on the amount lent. For example, a loan of less than one hundred dollars might be made simply on the basis of knowing that the individual to whom the money is lent has a job. For lending millions

of dollars, the lender may want to take a security interest in assets that have a value in excess of the amount lent, to cover fluctuations in the values of those assets during the time the loan is being repaid.

Not only will the borrower have an obligation to convince the lender  
5 that the borrower is creditworthy, the lender also has obligations to the borrower. For example, in consumer loans, laws require the lender to carefully explain certain aspects of the terms of the loan, and, if the borrower's application for the loan is turned down, the reasons why.

When time and foresight permit advance arrangement of loans, the act  
10 of borrowing can be made much simpler. When time is short and the need for the loan was not anticipated, the act of going through the process of borrowing may be so time-consuming that obtaining the loan may not be possible at all.

Typically, a business and an individual will either borrow relatively  
15 small amounts using credit cards, with pre-approved credit limits or go to a lending institution for larger sums, where the process of completing documentation for borrowing money takes longer and is subject to conditions that must be fulfilled before the loan can be made. Naturally, for large loans the safeguards for the lender take time. But for smaller loans, those above  
20 credit-card limits but still below a level where there might be a significant concern of the ability of the lender to repay the loan, there exists a need for greater convenience.

Other services offered by banks, such as applying for credit cards, are similar to borrowing money insofar as applications must be completed and  
25 processed for approval. Others are essentially administrative, such as opening

a checking or savings account, obtaining additional checks and obtaining a debit card. All such services must be obtained by going to a bank and completing the necessary documentation, with the attendant inconvenience.

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## SUMMARY OF THE INVENTION

According to its major aspects and briefly stated, the present invention is a method and apparatus for closed loop processing of financial transactions such as, especially, a loan or credit card application, including completion of the application, underwriting, and transferring of funds. The term "closed loop" means that all the steps involved are performed by a computer that is programmed to make the decision to approve or disapprove the request and to complete all aspects of it, including complying with regulatory requirements, on behalf of the financial institution within minutes of the time the consumer initiates the request for the particular service. In loan application processing, for example, the closed loop includes the steps of transferring the funds to the borrower and arranging for repayment, as well as completing the loan application and underwriting it, including execution of regulatory requirements related to consumer financing, all done without human intervention. In the primary examples presented in the present invention, for loans and credit cards, the apparatus uses a computer controller and a telecommunications link, plus other electronic communications equipment, to enable the complete, automated processing of the application; namely: (1) the exchange of information with the applicant, preferably using "touch-screen" or voice recognition technology; (2) the underwriting, which means the

- evaluation and, importantly, approval of the application, plus, most importantly; (3) immediately transferring electronically the funds from a source of funds to the deposit account designated by the applicant; (4) completing of consumer financing regulatory requirements; and, optionally,
- 5 (5) automatic withdrawals from the applicant's account to repay the loan.

With respect to financial transactions generally, the present invention is the closed loop performance of financial functions via a computer and monitor mounted in a kiosk, located in convenient places and using "touch-screen" or voice recognition technology, for the consumer to indicate choices

10 and provide information, and an electronic signature pad to obtain the signature of the applicant indicating understanding and acceptance of the terms of the transaction.

In the example of a loan or credit card, an applicant applies via a variety of communication and electronic routes to make contact with the

15 computer, which responds to the applicant and obtains information using touch-screen technology, in which the consumer applicant indicates a choice or supplies information by touching a computer monitor at the locations provided, or voice recognition technology, where the consumer simply states a choice or other appropriate response recognizable to the computer

20 controller. In the case of a touch screen monitor, the computer controller can sense touching of the screen electronically and determines the location touched. Information about the applicant is also obtained via electronic transfer of data to the computer from one or more databases, including those that provide name and address based on a caller's telephone number, and from

credit bureaus that provide credit reports on an applicant given an applicant's name, a social security number and an address.

In a preferred embodiment, the computer capability of the present invention also contains evaluation criteria in the form of underwriting models, that are used to "score" the application; that is, to make a determination of whether to approve the application based on a computer analysis of factors deemed important in assessing the would-be borrower's ability and willingness to repay the loan and to quantify the risk of its not being paid.

Finally, the loan agreement and other documentation, important for assuring that regulatory requirements have been met, are signed by the consumer using the electronic signature pad, and copies of the agreements with the electronic signature set in place are printed out for the consumer. The processing of the application is done completely and automatically, without human intervention.

In a preferred embodiment, the user-interface is a kiosk housing a computer controller, at least one telecommunications link, a monitor or "touch-screen" monitor, a camera to make a digital photograph of the applicant, a bank card reader to identify an applicant and activate the computer controller, and means for electronically transferring the signature and a photograph of the borrower onto the loan or credit card agreement. The kiosk may be established at a convenient location, such as an airport terminal, a bank, a shopping area or a store selling goods that might carry a price higher than a typical credit card limit, such as a jewelry store or computer sales store, for example. The kiosk can enable the consumer to establish checking and savings accounts, apply for and be immediately issued or sent credit and debit

cards, establish and fund individual retirement accounts, obtain savings bonds and certificates of deposit, arrange for automatic deposits to and withdrawals from accounts, obtain cashier's checks, and order checks for checking accounts.

5        An important feature of the present invention is the extent to which the financial transactions are processed by the computer controller and without human intervention. Computers are used to assist in processing applications routinely, but the extent of use here significantly exceeds that known in the art. Here, the processing by computer controller includes underwriting the  
10 application and deciding to make or deny the loan (or delay loan approval until more information is provided) or credit, and the issuance of funds in the form of an electronic fund transfer from a source of funds controlled by the computer controller or printing of a check by the printer housed in the kiosk, or issuance of a transaction card, such as a credit, debit or "smart" card,  
15 imprinted with the necessary information. The use of the computer to access certain information not within its own memory via telecommunications link also eliminates the need for human-based processing. Avoiding human intervention not only saves processing time and reduces errors, but also eliminates bias in the decision to approve or deny the application.

20        The use of a kiosk to make available to borrowers the communications capability for applying for a loan or credit card is another important feature of the present invention. Kiosks, placed in convenient locations, will contain electronic equipment that facilitates and speeds all of the steps of the application. Importantly, because funds are deposited directly into the  
25 borrower's bank account rather than dispersed directly to the borrower from

an automatic teller machine, the obtaining of funds from such a kiosk is safer than obtaining funds from a teller machine.

Yet another feature of the present invention is the use of an electronic signature pad to obtain signatures of consumers for applications, for signature  
5 specimens, for indicating an understanding of regulatorily-required disclosures, and for consent to the various financial services provided.

Because signatures can be obtained and recorded electronically, there is no need for the consumer to interact with a financial representative handling paper documents, and, therefore, financial transactions can be done at any  
10 time of the day. Documents that are to be given to the consumer can be printed out by the printer carried by the kiosk. In fact, the present invention greatly reduces the need for financial institutions to maintain offices and makes it more cost effective for them to provide kiosks in remote areas rather than branch offices.

Yet another feature of the present invention is the inclusion of a camera  
15 to make a digital photograph of the user for placing the photograph on checks, credit cards and loan documents, to prevent fraud and deter theft.

The use of "touch screen" technology, another feature of the present invention, makes it easier, quicker and more reliable for the consumer to  
20 indicate a selection.

Other features and advantages will be apparent to those skilled in the art of automatic financial transactions from a careful reading of the Detailed Description of Preferred Embodiments accompanied by the Drawings.



## BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings,

Fig. 1 is a flow chart illustrating the menu of services and the major  
5 steps of an automatic financial lending system according to a preferred  
embodiment of the present invention;

Fig. 2 is a perspective view of the front of a kiosk according to a  
preferred embodiment of the present invention; and

Fig. 3 is an enlarged view of the kiosk of Fig. 2 according to a preferred  
10 embodiment of the present invention.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention is a method and apparatus for providing closed  
15 loop financial services. In a preferred embodiment, these services include  
those identified in Fig. 1: specifically, making loans, issuing checks (such as  
cashiers' checks) certificates of deposit, treasury bills, mutual fund shares,  
issuing transaction cards, such as credit/debit cards and so-called "smart"  
cards, and establishing new accounts and depositing funds. The particular  
20 examples of loans and credit cards will be described in detail. However, the  
other services, as will be described presently, can also be obtained in  
accordance with a preferred embodiment of the present invention.

The present invention includes making a loan or obtaining a transaction  
card automatically, that is, a closed loop financial transaction. By the term  
25 "automatically," it is meant that an application is received and processed, the

decision to grant the loan or to issue the credit card, and the deposit of the loaned amount to the borrower's account, is made entirely by computers in conjunction with voice and electronic communication equipment. Similarly, in the case of other financial transactions, "automatically" also means each  
5 step is handled by the computer controller without human intervention, assistance or decision-making.

The term "required documentation" or "documentation required by regulation" refers to documents required by the lender as part of good financial institutional practice for meeting internal requirements and  
10 regulatory requirements. With regard to regulatory requirements in particular, the regulations are Federal Reserve Board Regulations B (12 CFR 202 et seq.) and Z (12 CFR 225 et seq) promulgated pursuant to Title I of the Consumer Credit Protection Act (15 USC 1640 et seq.) and the Federal Truth In Lending Act (15 USC 1601 et seq.), respectively. These regulations prescribe the  
15 information to be given to a borrower or potential borrower regarding the terms of the transaction and reasons for denial of credit. Financial institutions usually comply with these regulatory requirements by providing the information to consumers in writing and obtaining the consumer's signature that the information was in fact provided and understood.

20 "Transaction cards," used in the context of financial transactions, refer to credit, debit, "smart", merchant, or credit identification cards containing information encoded in some way on the card, such as magnetically.

Fig. 1 shows a flow diagram according to a preferred embodiment of the present invention. The user (sometimes referred to herein generally as  
25 "consumer" or "applicant" or "borrower" in the case of loan applications)

accesses the system by approaching a kiosk 40 (see Figs. 2 and 3) that has either voice recognition capability through a voice communication processor 30 or a monitor 50 with touch screen capability. Touch screen capability in monitors is well known. To indicate a choice presented by a computer  
5 monitor having touch screen capability, the user simply touches the screen at the location indicated. For example, images of a "yes" and a "no" button will appear and, by touching the "yes" button, the consumer indicates an affirmative answer to the question presented.

Use of voice communication processor 30 requires the consumer to  
10 state aloud a choice rather than point to one on monitor <sup>50</sup>~~40~~. This technology is obviously more sophisticated than touch screen technology but is also well known in several other applications.

Touch screen monitor 50 or voice communication processor 30 enables the consumer to "talk" to the transaction processor 10. By so communicating,  
15 information can be exchanged and the particular types of transactions selected by the consumer can be completed. Importantly, the consumer is interacting with transaction processor 10 without assistance from employees of the financial institution. Interacting with a transaction processor can be viewed as impersonal, but it can also be viewed as more private and freer of bias.

20 Kiosk 40 is activated by drawing an ATM or bank card or equivalent through a magnetically encoded card reader 70 or by providing a member number for credit unions or a merchant number for merchants and finance companies. The information encoded in the magnetic stripe on the back of the card is read by reader 70 and the information passed to transaction  
25 processor 10.

In a preferred embodiment, transaction processor 10 inquires of the consumer as to the type of transaction desired and selects the corresponding application or account information module, 130, 140, respectively, that then assists its informational gathering activities. If the consumer wishes to apply for a loan, credit or to set up a new account, application module 130 is activated to obtain the requisite information from the consumer and comply with lending institution and regulatory requirements associated with the particular application. If the consumer desires to withdraw or transfer funds or to make a purchase or a deposit, transaction processor 10 will activate account information module 140 to move funds from an account or from one source of funds to another account or will issue a check from kiosk 40 to the merchant or directly to the consumer.

In either case, information must be exchanged with the user. This information comes in part from the consumer's physically indicated or spoken responses to inquiries and in part from a database 60 using the borrower's telephone number for identification. Transaction processor 10 determines caller's name and address from database 60 based on the telephone number of the consumer or, in a preferred embodiment, from information encoded magnetically on a bankcard used by the consumer to activate kiosk 40. Other than confirmation that the consumer wants to apply for a loan (or, alternatively, to initiate one of the other transactions possible), the amount desired, and the term, transaction processor 10 initially needs only the applicant's name, address and social security number for identification. This information is used to obtain a credit report from a credit bureau.



Analyzing the loan or credit card application involves determining a score on which granting or denying the loan or credit card will be based. A typical scoring system simply assigns points to various factors that may be considered in the loan or credit granting determination. Preferably, however,  
5 an underwriting model is used for scoring the application or at least for updating on a periodic basis the points applied by a more traditional scoring system.

Underwriting model 90 is established by first identifying criteria that might have a bearing on the ability and willingness of the borrower to repay  
10 the loan or credit card. Then historical data is gathered to determine the influence, or weight, to be given to each criterion. The data is examined and the initial set of weighting factors are applied to develop estimates of the actual outcome of the data. The model's estimates are compared to the actual outcome, and the weights are adjusted to make the estimates closer until the  
15 outcome predictions have been optimized. Underwriting model 90 uses information calculated from the credit report, such as the ratio of debt to liquidity. An underwriting model designer will also make a judgment on how few criteria are needed to make a sufficiently accurate prediction. There are commercially available computer programs, known to those skilled in the art  
20 of computer decision-making, that can be used to develop underwriting models for the lending model upon entering the criteria and initial weighting factors.

If the analysis of underwriting model 90 determines that the loan should be made or the credit card issued, additional information is confirmed by  
25 transaction processor 10 from data obtained from database 60 or a credit

bureau or is obtained from the borrower using transaction processor 10, namely, the borrower's deposit account number, the caller's facsimile number, and the caller's acceptance of automatic withdrawal. Then, the terms and conditions of the loan or credit card must be established in writing and the borrower's signature obtained. Obtaining the signature of the borrower can be accomplished using an inkless electronic signature pad 100 and electronic pen 105 that, when the borrower makes a signature while holding pen 105, recreates, through digital technology, the signature of the borrower on the signature line of the documents displayed on the personal computer monitor.

10 A camera 110 carried by kiosk 40 can be used to take a photograph of the applicant digitally. A digitally generated photograph of the applicant can be placed on documents near the signature location. The signed documentation is printed using a facsimile or a laser printer (not shown) in kiosk 40. The documentation may include a copy of the digitally-generated photograph next to the signature and is issued through a printer port 120.

15 Transaction processor 10 then issues an electronic instruction to a source of funds such as lending institution (not shown) to transfer electronically the borrowed amount to the borrower's bank account at a deposit institution (not shown). Before the application is approved, however, there are several checks made by transaction processor 10 to prevent fraud. For example, the name of the applicant and the applicant's signature is verified, both electronically. Information obtained from the applicant including date of birth and the number of years with present employer, is compared to that available from a credit report or other sources such as the national death and birth records, drivers' licenses, criminal records, etc.

In a preferred embodiment, part of the terms of the lending agreement include permission from the borrower for the lender to make an automatic, periodic withdrawal from the borrower's bank account for repaying the loan. The automatic direct deposit by electronic fund transfer to and the automatic withdrawal of payment from the borrower's deposit account are especially important features of the present invention because they eliminate portions of the process from human control and delays. Also, if the borrower has an immediate need for the loan, direct deposit will make these funds available as quickly as possible, avoiding delays resulting from mailing, lost checks, the time taken for a check to clear, and the need to go to the deposit institution to make the deposit. Any documentation requiring the borrower's signature, including consumer lending disclosure information, will be handled as discussed previously.

No human needs to intercede. Transaction processor 10 communicates with the borrower to extract information from data base 60 and a credit bureau; underwriting model 90 makes the decision to lend, and transaction processor 10 obtains the signature of the borrower on the lending agreement using signature pad 100. Processor 10 effects the electronic fund transfer and arranges for automatic withdrawal of monthly payments. Throughout the process, transaction processor 10 will interact with the borrower using monitor 50 of kiosk 40 to prompt the borrower, who can indicate on the touch screen responses to processor 10 for the latter to obtain the credit report and process the application. Loan or credit documentation can be stored electronically by processor 10 in kiosk 40, or be transmitted by modem (not shown) within kiosk 40 and connected electronically to transaction processor



10, printed using an internal printer, and the copies of the forms issued through printer port 120.

As an example of the prompting that can be done, transaction processor 10 can ask: "Are you currently employed? Press 'yes' or 'no.'", "How much is your monthly income?", or "How much do you spend per month?" This information, provided by way of example, would be available from a credit report, but can be confirmed by prompting a response. Alternatively, if the information is asked and the responses, based on a partial analysis, indicate that the loan cannot be made or credit not extended, the applicant can be so informed by printing a regulatory-compliant credit denial letter, and the time, need and cost of obtaining a credit report can be avoided. The answers to the prompts can be input by the borrower by using "touch screen" monitor 50 in kiosk 40.

After approving the loan or credit card application, transaction processor 10 will review with the borrower the information relevant to the loan or issuance of a credit card, such as the account number to which the direct deposit will be made and the name of the deposit institution, the account number and name of the automatic withdrawal institution, the date of the month and the first month the automatic withdrawal will begin, the address and payee if the check is not intended for deposit into an account, late charges that could apply, the finance charge, the annual percentage rate, the total cost of all the payments, and the total amount financed. This information needed from the borrower regarding his or her accounts can be obtained by transaction processor 10 after underwriting model has made the determination to make the loan or issue the credit card.

The preferred embodiment for enabling a borrower to complete a loan or credit card application is housed in kiosk 40. Figs. 2 and 3 depict kiosk 40 for use by an applicant in initiating an application. A kiosk is basically a housing that can contain all of the equipment for a borrower to use in

5 contacting and communicating with a remote, centrally located transaction processor 10, or, alternatively, kiosk 40 can contain processor 10. Kiosk 40 includes monitor 50 with touch screen capability, a magnetic bank card reader 70 that enables a bank card to be read to identify an applicant as well as the applicant's bank and corresponding checking account, a magnetically  
10 encrypted card reader, an internal printer with communications link (not shown in Figs. 2 and 3) and, in a preferred embodiment, electronic signature pad 100 and associated electronic pen 105 and a security camera 110.

Signature pad 100 is a surface that converts the motion of electronic pen 105 as borrower holds it and goes through the motions of making a signature to an  
15 electronic image of a signature and transfers it electronically to transaction processor 10. Camera 110 takes a digital photograph of the consumer and transmits it to transaction processor 10 for application to checks, credit or debit cards, so-called "smart" cards, and loan documents. "Smart" cards are plastic cards with magnetically encoded information about the bearer of the  
20 cards, including such information as name, address, telephone number, social security number, any pertinent medical data, next of kin, account information, and so on.

In use, an applicant will enter kiosk 40 and indicate using "touch screen" monitor 50 his interest in a loan or any of the other financial services  
25 offered. He will be prompted by transaction processor via monitor 50 to run a

credit, debit, "smart", ATM or merchant card through a card reader 70 to identify himself or, alternatively, may simply enter sufficient other information to validate his identity. Transaction processor 10 will access one or more databases 60, such as a credit bureau, to obtain a credit report, to run a fraud analysis, for signature verification, or to see if the consumer has written bad checks or the card is stolen. As before, the information obtained from the applicant and from the credit report will be scored, preferably using underwriting model 90, to determine whether or not to approve the application. Whether approved or disapproved, the applicant will be so informed and the loan or credit information or, if appropriate, a loan/credit denial letter provided. The signature of the applicant can be obtained using electronic signature pad 100, and a signed copy of the agreement printed out through printer port 120 with a digitized photograph of the applicant. Meanwhile, the electronic transfer of funds will have been arranged and communicated to applicant (or to a merchant or dealer selling the item purchased with the loan) as well as obtaining the borrower's permission via a signed consent form done in similar fashion to have his deposit account automatically debited to repay the loan. All regulatory requirements will be met by presenting information to the consumer via monitor 50 and obtaining concurrence of understanding by a signature using signature pad 100.

As stated above, loans and credit cards are but one of many types of services that can be provided by a kiosk of the type described or with slight modifications. In fact, all the basic services provided by financial institutions -- depositing and withdrawing money, transferring funds from one account to another, establishing checking and savings accounts, arranging for automatic

deposits to and withdrawals from accounts, applying for credit/debit/smart cards, establishing and funding individual retirement accounts, purchasing certificates of deposit, savings bonds, and mutual fund shares, obtaining cashier's checks, and ordering checks for checking accounts -- can be done  
5 using the kiosk and computer controller of the present invention.

For example, and referring to Fig. 3, if a consumer has a checking or savings account with a particular bank and desires a debit card, one that enables him to debit such an account for purchases or to obtain cash, he can use the features of a kiosk 40, including a transaction processor 10 (see Fig. 1)  
10 and a touch screen monitor 50, its electronic signature pad 100, credit card reader 70, document and check printer (not shown), printer port 120, and credit/debit card port 150. In a procedure somewhat similar to applying for a loan, the consumer can apply for a credit card with a credit limit or a debit card that draws on his or her account. If, instead of a loan, the applicant  
15 wants a line of credit or has an account with a bank, a credit or debit card, respectively, can be imprinted by transaction processor, including a copy of the digital photograph taken with camera 110 and issued from kiosk 40 through credit card port 150 from a supply of cards kept within kiosk 40.

In establishing a checking or savings account, the consumer can  
20 transfer funds from another account to set up the new account or feed in a check to a scanner for deposit to the new account. Identifying the signature specimen can be obtained by the signing of electronic signature pad 100. Regulatory approvals can be obtained by first displaying documents on the monitor screen, highlighting those requiring careful explanation and obtaining  
25 both the consumer's acknowledgment that they were explained and that he

